

CLAIMS

1. A method for computing ranks in a linked database, the method comprising:
 - obtaining a local rank vector associated with a selected subset of nodes in the
5 linked database, wherein each component of the local rank vector
represents a local rank of a node in the selected subset of nodes;
 - obtaining a block rank vector associated with the linked database, wherein each
component of the block rank vector represents a block rank of a subset of
nodes in the linked database, wherein the subset is one of a plurality of
10 subsets of nodes defined by a partition of the nodes in the linked database;
 - selecting a component of the block rank vector corresponding to the selected
subset of nodes;
 - selecting a component of the local rank vector corresponding to a selected node in
the selected subset of nodes;
 - 15 combining the selected component of the block rank vector and the selected
component of the local rank vector to obtain a global rank for the selected
node.
2. The method of claim 1 wherein obtaining the local rank vector comprises
20 receiving the local rank vector from a computer that calculated the local
rank vector.
3. The method of claim 1 wherein obtaining the local rank vector comprises
selecting components of a preexisting global rank vector.

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4. The method of claim 1 wherein obtaining the local rank vector comprises forming a local link matrix comprising link weights between nodes of the selected subset and computing the local rank vector from the local link matrix.
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5. The method of claim 1 further comprising classifying the nodes of the linked database into subject classes and creating the partition of the nodes into the plurality of subsets in accordance with the subject classes.
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6. The method of claim 1 further comprising obtaining a plurality of local rank vectors associated with the plurality of subsets.
7. The method of claim 1 wherein obtaining the block rank vector comprises forming a reduced link matrix for the linked database and computing the block rank vector from the reduced link matrix.
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8. The method of claim 7 wherein forming the reduced link matrix comprises using a set of preference weights associated with the subsets to alter elements of the reduced link matrix so that the block rank vector is customized in accordance with the preference weights.
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9. The method of claim 1 further comprising calculating a final rank from the global rank using an iterative link-based ranking technique.
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10. The method of claim 1 further comprising using the global rank to determine an order of presentation of the selected node among other nodes.

11. A method for computing a rank value for a node in a linked database, the method comprising:
- partitioning nodes of the linked database into K subsets according to a
- 5 classification of the nodes;
- computing K local rank vectors for the K subsets of the nodes;
- computing a block rank vector from a KxK reduced link matrix;
- computing a global rank vector from the local rank vector and the block rank vector;
- 10 and
- selecting a component of the global rank vector corresponding to the node to obtain the rank value for the node.
12. The method of claim 11 wherein computing the K local rank vectors
- 15 comprises arranging a link matrix for the linked database into a block-diagonal form corresponding to the partition of the nodes into subsets;
- forming K local link matrices from blocks of the link matrix, and computing the K local rank vectors from the K local link matrices.
- 20 13. The method of claim 11 wherein computing the K local rank vectors comprises executing a link-based ranking algorithm on a local link matrix.
14. The method of claim 13 wherein the link-based ranking algorithm
- 25 comprises calculating a principal eigenvector of the local link matrix.

15. The method of claim 13 wherein the link-based ranking algorithm comprises performing a singular value decomposition of the local link matrix.
- 5 16. The method of claim 13 wherein the link-based ranking algorithm comprises forming a vector representing the row sums or column sums of the matrix.
- 10 17. The method of claim 11 wherein computing the K local rank vectors comprises dividing a preexisting global rank vector into K parts.
- 15 18. The method of claim 11 wherein computing the block rank vector comprises forming a reduced link matrix whose elements represent links between the subsets of the partition, and calculating the block rank vector from the reduced link matrix.
- 20 19. The method of claim 18 wherein forming the reduced link matrix comprises computing a block link weight between a first block and a second block by adding together weights of links from nodes in the first block to nodes in the second block.
- 25 20. The method of claim 18 further comprising customizing the reduced link matrix using a set of preference weights associated with the subsets.
21. The method of claim 11 wherein computing the global rank vector from the local rank vector and a block rank vector comprises:

computing an estimated global rank vector from the local rank vector and a
block rank vector;
computing the global rank vector from the estimated global rank vector
using an iterative link-based ranking technique.

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22. The method of claim 11 wherein computing the K local rank vectors is
performed at K distributed computers, and wherein computing the global
rank vector is performed at a central computer.

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23. The method of claim 11 wherein the linked database is a distributed
collection of hypertext documents and the classification of the nodes is
based on URL addresses of the nodes.

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24. The method of claim 11 wherein the classification of the nodes is a
predetermined subject classification of documents in the linked database.

25. The method of claim 11 wherein the classification of the nodes is
computationally determined from a link structure of the linked database.

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26. The method of claim 11 wherein the classification of the nodes is
computationally determined from a similarity of content associated with
nodes.

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27. A method for computing a rank value for a block of nodes in a linked database, the
method comprising:
partitioning nodes of the linked database into subsets according to a classification
of the nodes;

forming a reduced link matrix whose elements represent links between the subsets
of the partition;

calculating a block rank vector from the reduced link matrix;

selecting a component of the block rank vector corresponding to the block of

5 nodes to obtain the rank value for the block of nodes.

28. The method of claim 27 wherein forming the reduced link matrix comprises
computing a block link weight between a first block and a second block by
adding together weights of links from nodes in the first block to nodes in
10 the second block.